

Remarks

Claim 1 has been amended to (1) specify that the blowing agent consists of the carbamate material or a mixture of the carbamate material and water and (2) restrict the range of isocyanate index.

Page 13 lines 13-15 describe water as an auxiliary blowing agent, whereas physical blowing agents are identified at lines 8-11 as being optional types which, by virtue of being optional, clearly could be excluded from the composition. Example 2 describes a foam where the blowing agent consists of a mixture of a carbamate and water. Example 1 and page 12 line 33 clearly disclose the case where the carbamate is the only blowing agent.

Page 15 line 18 supports the amended isocyanate index.

Regarding the §103(a) rejection of claims 1-9, 11-13 and 15-16 over Rotermund and Guidetti

This rejection is respectfully traversed.

In the present invention, a rigid polyurethane foam is formed to an automotive part, using a foam formulation in which the blowing agent is a carbamate of an alkanolamine or a mixture of such a carbamate with water. The foam formulation provides an isocyanate component and a polyol component which provide an isocyanate index of 0.70 to 1.25 while having a volume ratio of from 5:1 to 1:5.

The primary reference, Rotermund (US 6,284,812) is concerned with rigid foam mainly for pipe insulation. Rotermund's foams must have high heat resistance combined with low brittleness and low thermal conductivity even at high temperatures. Col. 2 lines 17-19. The point of the Rotermund reference is that this combination of features was not commonly achieved in the prior art. Rotermund achieves these goals through a specific mixture of polyether and polyester polyols, a high isocyanate index (at least 1.5) together with a specific mixture of blowing agents (water and a physical blowing agent). That blowing agent mixture is, specifically, water, and a "physically acting blowing agent composed of the elements carbon and hydrogen and/or of the elements carbon, hydrogen and fluorine, both of which must be present in specified amounts. (A foam (Ex. 21) made using only water as the blowing agent is explicitly identified as "comparative" by

Rotermund.) One of skill in the art would recognize “physically acting” blowing agents as being those which produce a gas by volatilizing, rather than engaging in a chemical reaction (as do Guidetti’s carbamates).

Rotermund fails to teach or suggest applicants’ process. Rotermund does not describe forming any foam attached to an automotive part. Rotermund does not describe or suggest making any foam at an isocyanate index of from 0.70 to 1.25. Rotermund does not describe any foam which is made without a physical blowing agent.

Rotermund also fails to disclose any blowing agents that are carbamates of an alkanolamine. Instead the examiner relies on Guidetti for its teaching of that class of blowing agents.

Guidetti does not relate to pipe insulation or even to rigid polyurethane foams. The only polyurethanes Guidetti specifically describes are elastomeric materials, i.e., rubbers. Guidetti describes applications such as carpets, door seals, coating, tires, wiper blades, steering wheels, gaskets, belts, panels and shoe soles (col. 9 lines 22-51), all of which are obviously rubbery materials. These typically have a Shore A hardness of from 20A to 80A (col. 7 lines 33-35), which is indicative of a soft, rubbery material. These materials are not rigid polyurethane foams of the type described by Rotermund. There is nothing whatsoever in Guidetti, other than the mere fact that the carbamate blowing agents can produce gas by reacting with a polyisocyanate, which suggests that the carbamates would have any application in making rigid foam useful for pipe insulation, as taught by Rotermund.

It also clear that the Guidetti carbamates are incapable of forming the low density foams described in Rotermund (see Rotermund’s examples in which densities are 100 kg/m³ or below), which is yet another reason one skilled in the art would not substitute Guidetti’s carbamates into Rotermund’s process. Guidetti’s foams are at least five times denser than Rotermund’s.

Therefore, except with benefit of applicant’s teaching, one of ordinary skill in the art would not have any reason to modify Rotermund using Guidetti’s teachings. The applications in the two references are very different, and Rotermund is very specific about requiring both water and certain physical blowing agents in his formulation (neither of which is a carbamate of any kind), in conjunction with other specific components, in order to attain the specific set of properties he needs for his pipe insulation application.

Regarding the §103(a) rejection of claims 6, 7, 8 and 10 over Rotermund, Guidetti and WO 02/078340

This rejection relies on Rotermund and Guidetti as before, with the addition of WO 02/078340 for its teachings concerning amine-terminated polyethers (present claim 10), hydroxyl-functional (meth)acrylate terminated prepolymers (present claim 7) and plasticizers (present claim 8). However, WO 02/078340 does not describe any carbamates of an alkanolamine as a blowing agent. WO 02/078340 therefore fails to cure the basic deficiencies of the combination of Rotermund and Guidetti.

Regarding the Provisional Obviousness-Type Double Patenting Rejection

The obvious-type double patenting rejection over copending application 11/403,658 alone or in view of WO 02/079340 is noted. As noted by the examiner, the rejection is provisional because the claims in the other case have not yet been patented, and no claims are as yet indicated by the Office as being in condition for allowance. Applicants stand ready to file a terminal disclaimer in this case or in 11/403,658 when allowable subject matter is indicated in at least one of the cases, if the office still considers the obviousness-type double patenting rejections to be appropriate given the foregoing claim amendments and any further amendments that subsequently may be made in either of the two cases.

Respectfully submitted,
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